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PATENT SPECIFICATION

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COMPLETE SPECIFICATION

Device for Protecting Constructions from Bombardments from the Air

I, MAXIMILIEN HAASE, a French citizen, of 2 rue du Stauffen, Colmar, Haut-Rhin, France, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement :—

For the purpose of protecting from bombardments from the air, buildings of a first military order as, for instance, munition depots, hangars, etc., certain constructors resorted to the system of constructing them as subterranean buildings covered over with a thick layer of earth or reinforced concrete. This system of protection is very expensive and not applicable to ships, churches, stations, blast furnaces and numerous other industrial buildings. Therefore, the problem arises of protecting buildings erected on land, as well as ships at sea, by means of a system which is also applicable to buildings already completed, whilst at the same time capable of being rapidly erected and at a reasonable price relatively to the value of the building.

However, it has been suggested to arrange wire nets above the constructions to be protected, said nets being connected at their ends to a rope frame and supported below by crossed ropes; alternatively, a screen of woven spring steel wire has been suggested with interstices sufficiently small to intercept projectiles and with sufficient give or spring in it so as not to offer a rigid resistance to projectiles.

The invention consists of means for the protecting of buildings and ships from aerial bombardments by extending nets above the constructions to be protected, and which is characterised in that the net consists of a system of crossed cables stretched by springs or other analogous means and which due to their flexibility are capable of breaking and deadening the fall of bombs and of limiting tension due to wind, snow or ice.

If a bomb drops into the net, the latter, due to its flexibility, offers no resistance, and it is not pierced by the bomb. On the other hand the net will follow a vertical direction, but its resistance will rapidly increase and finally the bomb will be arrested without having been able to reach the construction.

In principle, the protective net may be horizontally stretched, as shown in Figs. 1 and 2, or else it may be stretched slanting like a roof, as shown in Figs. 3, 4 and 5. The arrangement of the horizontal net which is intended to catch the bomb in the net itself is suitable for the protection of buildings on land. The arrangement of the net slanting like a roof, however, is more suitable for ships. These two examples of flexible protective net will be described hereunder.

On the accompanying drawings,

Fig. 1 represents a transverse section, and

Fig. 2 a top view above the horizontal protective net 1.

The net is stretched between the four standards 2 above the building 3. The four standards 2 are connected together by four principle cables 4, 5, 6 and 7. To the principle cables 5 and 7 are attached the longitudinal wires 8. These wires are hooked at one or two extremities to springs 8^1. The transverse wires 9 are also connected by springs 9^1 to the principle cables 4 and 6. The elastic element, the spring, may also be provided in the principal cables 4, 5, 6 and 7 at the points indicated by 10. It is also possible to arrange the elastic element in the extremities of the principal cables joined at the point marked 11. It is even possible to provide the elastic element in the cable which holds the standard marked 12. In such case the standards 2 must be mounted on balls to permit of the necessary movement. The essential point consists in the elasticity of the system produced by springs or other means located at some suitable place on the net, so as to realise the vertical flexibility of the net.

The longitudinal wires 8 and the transverse wires 9, which are elastic, therefore constitute the carrying element of the flexible net. On said wires are arranged and attached segments of closely meshed nets of which one only, 13, is shown in

Fig. 2, The segments 13 which are located independently of each other on the system of elastic wires 8 and 9 are easy to replace and likewise the elastic wires 8 and 9 can be connected by end pieces by persons who may walk on the net, in the event of a bomb bursting and damaging the net.

In order to increase safety, two systems of nets may be provided, one under the other, at a certain distance. The function of the upper net is to effect the explosion of contact bombs in the air above the principal net at a certain distance from the former. If, due to the explosion of a bomb, a hole is made in the upper net through which another bomb may drop, the latter will be caught by the second net.

Figs. 3, 4 and 5 illustrate the arrangement of the net in oblique form like a roof, provided above a warship 14. The net 1 is suspended from the masts and the funnels of the ship. This net consists of a series of parallel wires 15 which descend vertically. The wires 15 are stretched between a frame 16 which has approximately the profile of the ship seen from above and between the cable 17 which corresponds to the ridge of a house. The parallel wires 15 are distanced from one another by transverse connections 18, details of which are shown in Fig. 6. The transverse connections 18 are fixed on the wires 15 by means of an element 19 which encloses three-fourths only of the wire 15 and which is curved towards the under-side of the net, so that the bomb may slip along the wires and not remain caught on the transverse connections 18. The distance of the wires 15 must be such that the bombs cannot pass between them. In the parallel wires springs are arranged similar to the horizontal net and bombs are diverted by the incline and slip into the sea.

The protective nets provided above military and industrial buildings offer the great advantage that they are capable of carrying painted cloths to conceal the constructions in the daytime and even at night. The industrial production is not interrupted when the bombarding aeroplanes approach.

Furthermore, due to its flexibility, the net is protected from any excessive strains caused by gales, snow or ice.

It is known that a net stretched in a non-supple manner will break under the weight of ice. In effect, when the threads of a horizontally stretched net are loaded with ice or bombs the horizontal component of traction in the treads will be, theoretically, infinitely large. The net will be easily broken if the elasticity inserted between it and its point of attachment will not permit of the threads being inflexible in a manner sufficient for the component of traction present in the threads remaining in the admissible limits. The suppleness of a net is an essential feature in order to assure the necessary security against fracture under the action of a vertically acting load, such as ice or bombs.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is :—

1. Means for the protecting of buildings and ships from aerial bombardments by extending nets above the construction to be protected, characterised in that the net consists of a system of crossed cables stretched by springs or other analogous means and which due to their flexibility are capable of breaking and deadening the fall of bombs and of limiting tension due to wind, snow or ice.

2. Protecting means according to claim 1, characterised in that the spring stretched net consists of a system of elastic wires on which are fixed several independent segments of close mesh net.

3. Protecting means according to any of the preceding claims characterised in that the net has a steep inclination so that bombs can slide thereon and can be brought down along the side of the building.

4. Protecting means according to claim 3, characterised in that the net consists of wires which, in the perpendicular direction, are arranged in parallel lines and are distanced by transverse connections curved towards the under side of the net so that the bombs may slip downwards without being caught in the transverse connections of the net.

5. Protecting means according to any of the preceding claims and including several nets arranged at an appropriate distance from one another above the building to be protected.

6. Protecting means according to any of the preceding claims wherein the net or nets carry painted cloths to hide the building from the view of bombarding air-machines.

7. Means for protecting buildings and ships from aerial bombardments constructed and adapted to operate substantially as described with reference to the accompanying drawings.

Dated this 8th day of September, 1938.

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518,338 COMPLETE SPECIFICATION

1 SHEET

[This Drawing is a reproduction of the Original on a reduced scale.]

Fig.-1

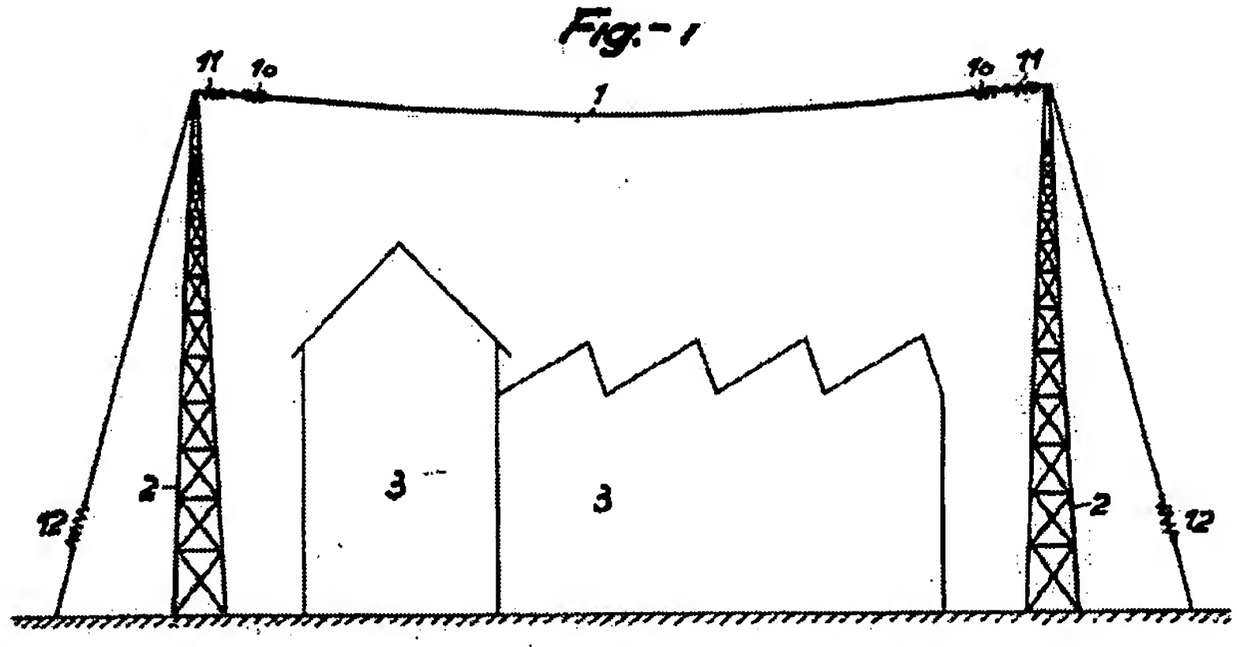


Fig.-2

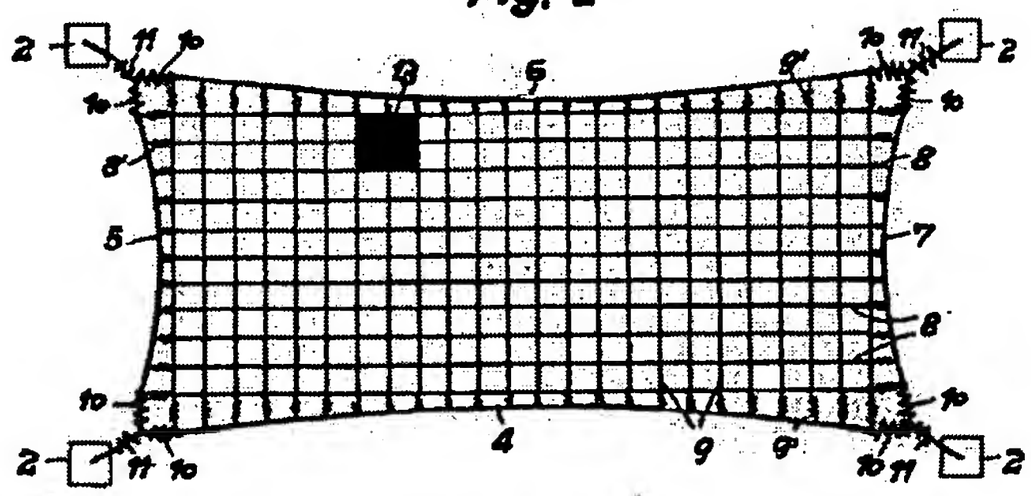


Fig.-4

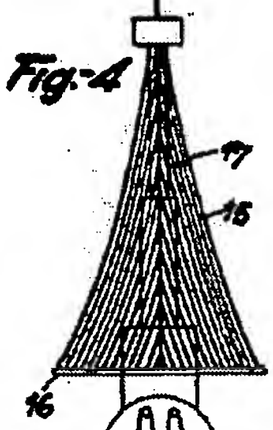


Fig.-3

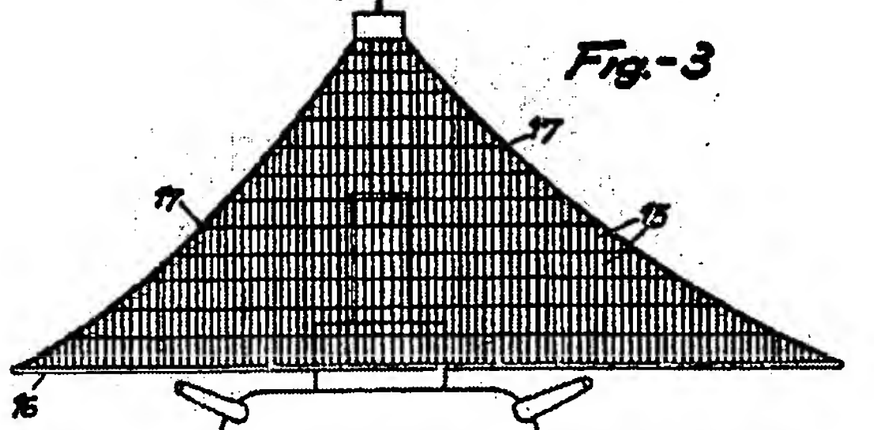
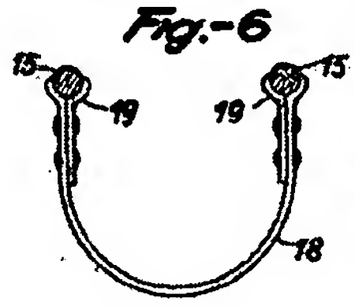


Fig.-6



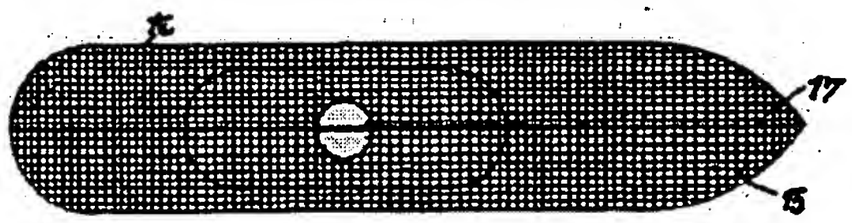


Fig.-5

Melby & Sons, Photo-Lith.